

# The World's Most Trusted Name In Color Quality HunterLab

## Introduces The ColorFlex EZ

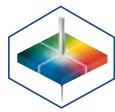


### 45/0 Design: For Relentless Perfection in Color Quality

#### The Power to See Color the Way Your Customers Do

HunterLab's next generation Color Flex EZ spectrophotometer takes color quality control to its highest level with 45/0 design for the ultimate in color measurement precision. Combining versatility, simplicity and performance, the ColorFlex EZ reflects almost 60 years of color measurement innovation in one easy-to-use, compact instrument from the world's most trusted experts in color quality.

HunterLab's ColorFlex EZ offers the advantage of 45/0 design ensuring that you not only get your colors right - but perfect every time. It is the optimal and only instrument design that measures your samples the way the human eye does. It lets you see your colors exactly the way your customers do, not just in the lab but in the real world.



**HunterLab**  
Measure Color...Measure Quality

## More Connectivity

More options to connect to a wide variety of devices:

- USB flash drives to transfer results to several machines or computers
- Keyboards to enter custom sample Id's manually
- Barcode scanners to scan samples fast without data entry errors
- Printers to get instant hard copies of sample readouts
- Computers to plot data using HunterLab's Easy Match QC software

## More Simplicity

Easy to operate for all your color measurement challenges:

- Ergonomic push buttons to deliver lightning fast results
- A large 3.7" [93.98mm] high resolution easy-on-the eye color display
- 3 USB 2.0 communications ports to connect to a wide variety of devices
- Small size requiring very little benchtop space
- Versatility to inspect raw materials or finished products in the lab or in production
- A variety of sample handling accessories



## The HunterLab Advantage

The ColorFlex EZ is backed by over 5 decades of color quality innovation and experience from HunterLab, the world's most trusted color quality experts.

With an unmatched reputation for delivering the right solution for the right challenge, HunterLab tailors products and technologies for every color measurement need and budget offering the broadest range of color measurement solutions in the industry.

## More Performance

More capabilities for increased performance and better outcomes:

- Sampling versatility to measure everything from opaque solids, liquids, powders, granules and pellets to translucent solids and liquids
- Easy data transfer to move set ups and standards from one instrument to another and up load or download to USB Flash drives for back ups
- Expanded sample storage for 250 setups, product standards and tolerances and up to 2000 sample measurements

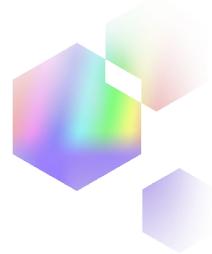


## More Flexibility

Built-in software using 250 set up configurations with product standard values and tolerances for a wide variety of parameters including:

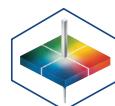
- Color Scale, Indices, Illuminant, Observer to specify conditions under which data is reported
- Standard values to identify product standards or targets for color comparisons
- Pass fail tolerances to measure against product specifications
- Averaging to provide accurate measurements of uneven or inconsistent samples
- Display formats to report measurement data multiple ways such as color data, color difference data, spectral difference data and many other ways.

# Presenting...



## MiniScan® EZ

The Easy To Use Portable Color Measurement Spectrophotometer



**HunterLab**  
Measure Color...Measure Quality

# MiniScan® EZ

## Makes color measurement simple



Portable, rugged, ergonomically designed and dependable, MiniScan EZ travels anywhere. You can easily use this lightweight, compact instrument wherever it's needed – on the plant floor, the production line, the warehouse, or outdoors. There's no need to take samples to the lab.



## Easy to Use

MiniScan EZ is lightweight and ergonomically designed for operator comfort. Including batteries it weighs only 1 kg (2.25lb) and a rubberized handle provides sure handed carrying and use. The handle virtually eliminates hand fatigue when measuring a large number of samples. Using the button pad that is built into the handle, it is simple to operate with thumb-tip navigation of all functions. MiniScan EZ has a large easy to read, LCD graphical display. The display orientation can easily be rotated through four orientations of 0°, 90°, 180° and 270° for viewing from any position.

pad is built into the handle, it is simple to operate with thumb-tip navigation of all functions. MiniScan EZ has a large easy to read, LCD graphical display. The display orientation can easily be rotated through four orientations of 0°, 90°, 180° and 270° for viewing from any position.

MiniScan EZ gives you instant, accurate data anywhere and the measurements can be stored in memory for later printout or download to a PC. You can store as many as 100 product standards and 800 sample readings.



Using MiniScan EZ it is simple to determine the color of a sample, the color difference between two samples, or the color difference between a sample and a product standard. If you are comparing the color of samples to a standard, MiniScan EZ lets you enter the standard values two ways: either by reading a standard or by manually entering the standard's color values. When you want to measure absolute color values, MiniScan EZ's hitch standard feature helps ensure agreement with other color measurement systems. You can easily enter Pass/Fail tolerances for each product standard or you can use the CMC color difference auto tolerance capability. CMC provides automatic tolerances based on the standard's color. This translates into faster implementation of a color control program and increased productivity.

## Precise Measurement

MiniScan EZ has a xenon flash lamp as a light source. To ensure measurement repeatability and stability, double beam optics are used to monitor the source and spectrally compensates for any variation. MiniScan EZ scans the visible spectrum from 400-700nm with 10nm resolution for accurate measurement of sample color. A check tile is provided with each instrument to ensure accuracy is maintained. MiniScan EZ conforms to all widely accepted industry standards for reflected color measurement and permits measurement in all commonly used color scales. Up to 20 measurements can be averaged to give more repeatable results on non-uniform samples.



# System Geometry



System geometry defines how the sample is illuminated and the angle at which the reflected light is measured. To best fit your measurement requirements, MiniScan EZ is available with **45°/0° or diffuse/8°** measurement geometry.

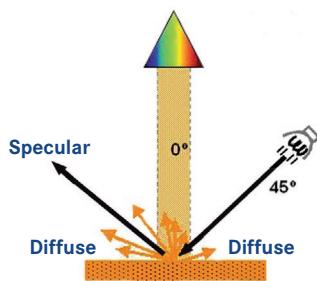
## 45°/0° Geometry

If you want to measure how the sample appears to your customer, the 45°/0° system is best. This system

illuminates the sample at a 45° angle and measures it at 0° which is perpendicular to the sample.

The 45°/0° MiniScan EZ ignores the glare from the sample (specular excluded) and sees both the effect of sample coloration and the effect of its gloss or texture. This is how your customer visually sees it.

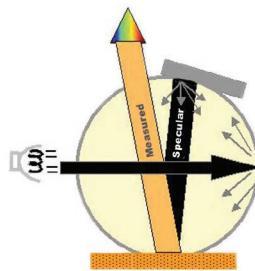
### 45°/0° Geometry



## Diffuse/8° Geometry

If you want to know only the sample's coloration, ignoring the effect of its gloss or texture, then the d/8° system is best. The diffuse/8° MiniScan EZ illuminates the sample diffusely and measures it at an 8° angle to the surface. This geometry includes the sample glare (specular included) and will only see the effect of coloration, ignoring its surface characteristics. Thus the measurement will not agree with what you see. Some other d/8° instruments have a mode that approximates specular excluded; however measurements in this mode are significantly less precise than those of a 45°/0° instrument.

### d/8° Geometry



# Measured Area

A large area view and small area view model of MiniScan EZ is available for each of the two geometries. It is always best to measure the largest possible area of a sample. The 45°/0° LAV (Large Area View) MiniScan EZ has a 31.8mm measurement port and the d/8° LAV MiniScan EZ has a 25.0mm port. Both of these systems provide an excellent optical average of the sample for each measurement and reduce the number of readings needed for averaging of non-uniform samples. If it is necessary to measure small sample areas, such as for small parts or curved surfaces, a SAV (Small Area View) MiniScan should be used. The 45°/0° SAV MiniScan EZ has a 6.0mm measurement port and the d/8° SAV MiniScan EZ has a 14.3mm port. When measuring small sample areas, you should average several readings to compensate for sample non-uniformity.



# Measurement Versatility



MiniScan EZ has built-in software that is highly versatile. It permits tailoring up to 100 customized setup configurations with product standard values and tolerances to suit specific product or customer requirements. It can also be used with HunterLab's EasyMatch® QC software.

## Each setup includes these parameters:

- **Color Scale, Indices, Illuminant, Observer**

To specify the conditions under which the data is to be reported

- **Standard Values**

To identify the product standard or target with which to compare for color difference

- **Pass/Fail Tolerances**

Per your product specifications or automatically for CMC

- **Averaging**

To provide accurate measurements of uneven or inconsistent samples

- **Display Format**

Reports measurement data multiple ways: color data, color difference data, color plot, spectral data, spectral difference data, spectral plot and spectral difference plot

A wide variety of illuminants, observers, color scales and indices are provided with MiniScan EZ.

These include:

- **Illuminants:** A, C, D50, D55, D65, D75, F2, F7, F11

- **Observers:** 2°, 10°

- **Color Scales:** CIE L\*a\*b\*, Hunter Lab, CIE LCh, CIE Yxy, CIE XYZ

- **Color Difference Indices:** ΔE\*, ΔE, ΔC\*, ΔC, ΔEcmc

- **Color Difference Scales:** ΔL\*a\*b\*, ΔLab, ΔLCh, ΔYxy, ΔXYZ

- **Indices and Metrics:** E313-96 Whiteness (C/2° and D65/10°), E313-96 Yellowness (C/2° and D65/10°), D1925 Yellowness (C/2°), Y, Z%, 457nm Brightness, E313-96 Tint (C/2° and D65/10°), Opacity, Strength, Gray Change, Gray Stain, Metamerism, Shade Numbers



## System Features

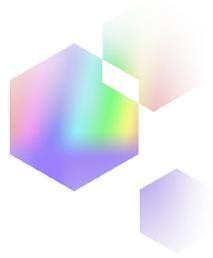
- Available with 45°/0° or diffuse/8° geometry and large area or small area view
- Light weight and rubberized handle for operator comfort
- Easy one handed operation with thumb-tip navigation of functions
- Large, easy to read LCD graphical display
- Displays color data, color difference data, color plot, spectral data, spectral data difference, spectral plot, spectral difference plot
- Includes all commonly used color scales and indices

- Easy color difference determination
- Averages up to 20 sample readings
- Stores 100 standards and 800 sample measurements
- Easy pass/fail determination using user entered tolerances or automatic tolerances
- Multiple languages
- Thousands of measurements on standard AA batteries
- Excellent measurement repeatability and inter-instrument agreement
- USB interface

Dedicated to worldwide support through local representation, HunterLab provides over 55 years of experience to meet the color measurement needs of customers around the world. We offer the industry's most comprehensive set of end-to-end solutions – an integrated package of resources, from the complete array of instrumentation, software, and support services to training, education and decades of application knowledge.

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# Presenting...



## LabScan<sup>®</sup> XE

Measure color from a whole new perspective



**HunterLab**  
Measure Color...Measure Quality

# LabScan® XE

Engineered for performance - Designed with automated simplicity

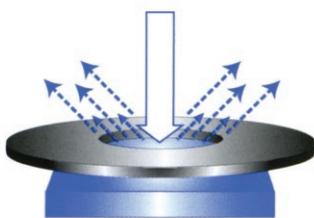


There's a new dimension in the way you'll look at measuring samples. The LabScan XE spectrophotometer takes color measurement to a new and totally different level of sophistication, with more simplicity, more automated features and more versatility than any other product.

From powders, solids and liquids, to pellets, chips, yarn or paper, LabScan XE is the cutting-edge solution for a host of color measurement applications in plastics, textiles, paint, food, paper, chemicals, pharmaceuticals and building materials.



## Measure Measure Like the eye “sees” color



To the eye, the same color, when seen on surfaces that differ by gloss or texture, appears to be a different color. LabScan XE measures and “sees” that difference the same way the human eye does.

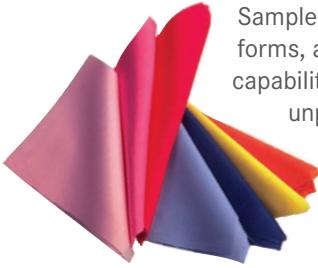
**0°/45° optical geometry for a better perspective on “seeing” color.**

The same color, when seen on surfaces that differ by gloss or texture, ends up “looking” like a different color to the human eye. LabScan XE’s 0° / 45° circumferential geometry incorporates a 15-station, fiber-optic ring that collects and averages reflected light from all the stations. The result is a fast, simplified measurement that automatically accounts for the effects of variations in textures, finishes or granulations.



# Measurement Versatility

## Versatility in measuring—from incoming raw materials to finished goods.



Samples come in all sizes, shapes and forms, and LabScan XE gives you the capability to measure their color with unparalleled versatility, simplicity and accuracy. For instance, it features one of the largest illuminated areas available—44mm—which gives you superior precision when scanning textured, non-uniform samples.

An optional automated Variable Sample Illumination (VSI) feature allows you to measure from 44mm to 3mm, for maximum flexibility in the sizes and kinds of samples you can measure. The VSI feature also gives you far more accuracy in measuring translucent solids or liquids. What's more, you can measure with the sample port facing up, forward (sideways), or, with an optional stand, straight down. It also delivers superior reading agreement between multiple instruments.

## Color formulation or QC, in the lab or on the plant floor.

LabScan XE is well suited to both quality control and color formulation applications. Use it with a PC in the lab or production, running with our EasyMatch® QC Software for QC, or with our EasyMatch® color formulation software. Or, use it in combination with our rugged and dependable DP-9000® processor in harsher plant environments.

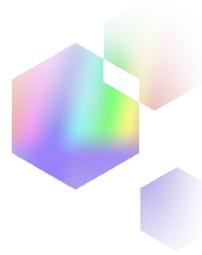


An optional Port Down Stand lets you view and measure samples from a straight-down angle for added versatility.

## Standard Features

- 0° Illumination/45° Detection - measures and accounts for variations in textures and finishes: “sees” color the way the eye does.
- 44mm (1.75 in) Reflectance Port - one of the largest available for a spectrophotometer; averages sample non-uniformity.
- Xenon Lamp - long life, best match to D65.
- Automatic Reference Standardization - internal tile to maintain optimum measurement stability.
- No Fan or Air Filter - increases reliability, reduces maintenance.
- Compact, Single-Piece Design - space-saving footprint, no external power supply.
- Dual-Beam Optics - the optimum level of accuracy, repeatability and long-term performance.
- Read Function Button - next to sample port; measurement can be taken at sensor without moving hands to the computer.
- Port-Up or Port Forward Orientation - measure liquids, solids, powders or pastes.

# Optional Features



- Automated Variable Sample Illumination - user sets illumination to desired size (from 44mm to 3mm); computer checks agreement between port plate, illuminated area and standardization mode for error-free measurement; user can store and recall standardization modes quickly.
- Automated UV Control and Calibration - system automatically controls UV content for consistent measurement of optically brightened samples.
- Automated UV Included/Excluded Filter - allows measurement with and without UV energy to quantify sample fluorescence.

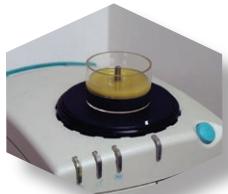
## Sample Handling Devices

Numerous specialized sample handling devices are available to enable optimum sample presentation for a wide range of samples. Many of these are shown below. Contact your HunterLab representative for information on other devices or to have a custom device designed for your unique application.



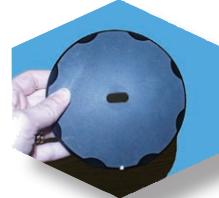
### Sample Clamp

Holds samples securely at the sample port for measuring with the instrument in the port forward orientation.



### Sample Cup Set for Translucent Liquids

This set permits the measurement of transparent or translucent liquids and semi-solids.



### Capsule Shaped Port Insert

For the reflectance measurement of capsules.



### Port-Down Stand

Permits port-down mounting of the sensor. Includes an adjustable arm assembly with clamp.



### Compression Cell Set

Used to compress fibers into a compact mass to permit repeatable color analysis.



### Semi-Micro Powder Holder

Permits the reflected color measurement of as little as 0.4cc of packed powder.

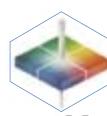
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Presenting...



# UltraScan® PRO

The Professional Color Measurement Spectrophotometer



**HunterLab**  
Measure Color...Measure Quality

# UltraScan® PRO

The ultimate color measurement system



UltraScan PRO is a high-performance color measurement spectrophotometer. It provides the data dependability required for both research and quality control applications. Because of its exceptional inter-instrument agreement, precise spectral measurement and unsurpassed long term stability, you can be confident that differences between measurements are due to product color changes, not instrument variability. Materials on the borderline of accepted tolerances will not be unnecessarily rejected.

The UltraScan PRO measures both reflected and transmitted color as well as transmission haze and meets CIE, ASTM and USP guidelines for accurate color measurement. The instrument's 5nm optical resolution enables it to precisely measure colors with sharp cutoff characteristics. Its D65 illumination source is calibrated

in both the ultraviolet and visible regions for the accurate measurement of whitening agents and fluorescent colors. Having an extended measurement range, into both the near infrared and near ultraviolet, permits the measurement of camouflage materials and UV blockers. Both a reflectance tile and a didymium transmission filter are provided as check standards to verify instrument performance. UltraScan PRO uses diffuse/8° geometry with automated specular component inclusion/exclusion. It also features three sizes of sample measurement areas with automated lens change. These measurement capabilities, along with a host of specialized sample handling devices, make UltraScan PRO the most versatile high-performance color measurement spectrophotometer available. Contact your HunterLab representative for a detailed specification sheet.

## Exceptional Performance

The high intensity xenon flash lamps used in the UltraScan PRO ensure accurate readings on all colors, including those that are dark and highly saturated. Even carbon black can be measured. The light source generates virtually no heat, eliminates the effect of ambient light, and requires no warm-up. UltraScan PRO uses diffuse/8° geometry with an integrating sphere, permitting both reflection and transmission measurement. For transmission measurement, the sphere geometry virtually eliminates errors introduced by sample turbidity and haze. The dual beam optical system has two state-of-the-art holographic grating polychromators with an effective bandwidth of 5nm. Having an extended wavelength range of 350nm to 1050nm enables the measurement of camouflage materials and solar glazing. Measurements of the entire spectral range are made in a matter of seconds. Spectral data is taken every 2nm and reported for every 5nm. Tristimulus color calculations are performed using 5nm data from 360nm to 780nm as recommended by the CIE.



## Easy to Use



UltraScan PRO incorporates many automated functions to make operation simple and reliable. Status indicator lights visually indicate selected mode and reduce the chance of error in instrument setup and operation. Specular included/excluded modes, UV control and sample viewing areas are all under computer control. Additionally, a read button is located close to the sample port for convenient initiation of sample measurement and a sample viewing screen assures the position of small samples at the reflectance port. For system communication both USB and RS-232C outputs are provided.

# Unsurpassed Versatility

Use UltraScan PRO for both research and quality control. From opaque solids to clear liquids to transparent films, UltraScan PRO precisely measures both reflected and transmitted color, spectral reflectance, spectral transmittance and transmission haze. A host of measurement features and specialized sample handling devices make UltraScan PRO the most versatile high-performance color measurement spectrophotometer available.

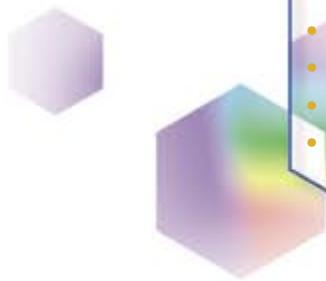


## Automated UV Control

To measure materials that have UV induced fluorescence, such as optical brighteners, the UltraScan PRO uses D65 illumination that is precisely calibrated and controlled in the ultraviolet. A UV control filter is motorized and automated for convenient system calibration using the fluorescent standard provided with the instrument. This filter can also be fully inserted into the light path to exclude UV energy. Additionally, UltraScan PRO has the ability to measure sample reflectance and transmittance as low as 350nm, permitting the measurement of UV blocking characteristics of coated glass, sunglasses and other UV absorbers.

## Measure

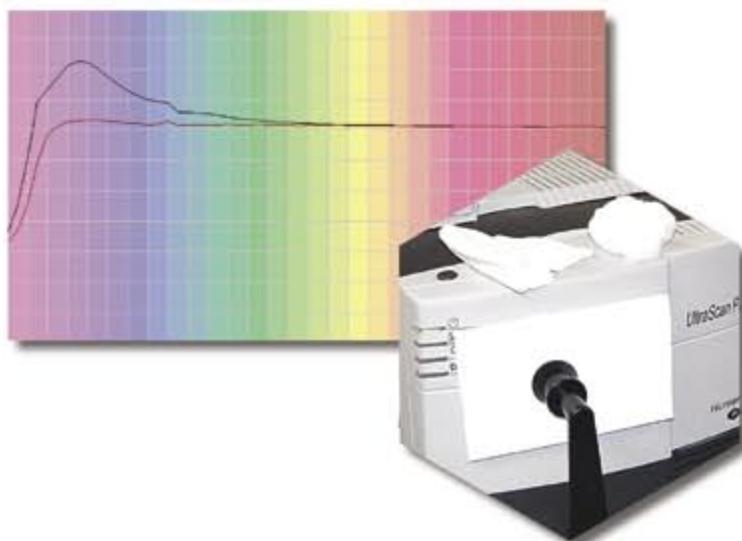
- Absorbance
- Brightness
- Color
- Haze
- K/S
- Metamerism
- Opacity
- Reflectance
- Strength
- Transmittance
- Whiteness
- yellowness

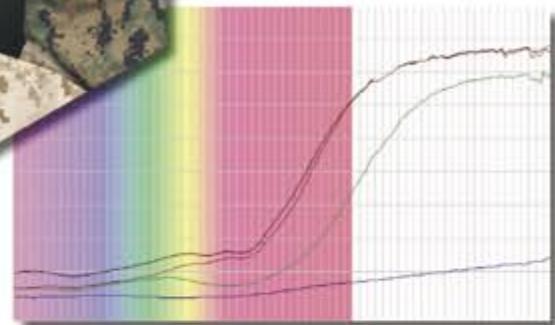


## Versatile Transmission Compartment

The transmission compartment of UltraScan PRO makes measuring over-sized samples easy and accommodates various sample handling devices. Yet it is capable of measuring liquid volumes as small as 0.4ml. The spacious compartment is open on three sides so you have access from either side or from the top of the sensor. It accommodates thin films, sheets, solids and transmission cells with path lengths up to 80mm. Samples can be positioned to make regular and total transmission measurements.

- **Regular (Direct) Transmission** – with the sample close to the lens system is most similar to traditional UV-VIS spectrophotometer geometry; however, measurement precision is affected by sample haze and turbidity.
- **Total Transmission** – with the sample close to the sphere is the most precise way to measure transmitted color. The effect of sample haze and turbidity on measurement precision is minimized.





## Near Infrared Measurement Capability

Having the ability to scan from 350nm up to 1050nm in a matter of seconds, the UltraScan PRO is capable of measuring NIR reflectance and transmittance of a wide range of materials. These include the reflectance of paint, plastic and textile camouflage materials and the NIR characteristics of architectural glass and plastic security cards.



## Versatile Sample Clamp

Large, small and odd shaped samples are all easily positioned at the reflectance port with the over-sized, spring-loaded sample clamp. Two quick release buttons allow you to adjust and set the clamp position. The clamp pulls down a full 180° and can be pulled out in small increments to accommodate thick samples or be removed entirely.

## Multiple Sample Apertures

Three reflectance measurement apertures are provided with the UltraScan PRO to enable you to use the size that is appropriate for your sample. They are 25mm (1.00inch), 13mm (0.50inch) and 7mm (0.25inch) in diameter with respective optical viewing areas of 19mm (0.75inch), 9mm (0.35inch) and 4mm (0.16inch). The back of these apertures have a white coating to maintain sphere efficiency. The user selects a viewing area and the system automatically inserts the appropriate lens. To assure that the proper viewing area has been selected, the system monitors agreement between sample port inserts, lens position and standardization mode. Standardization modes can be stored, then quickly recalled, to speed and simplify multiple mode measurements. A sample viewing screen assures the position of small samples at the reflectance port.

## Automated Specular Included/Excluded

A motorized port door permits measurement with the specular component included to measure reflected color without the effect of gloss or texture. The specular exclusion mode is used to measure color including the effects of gloss and texture. The port door position is controlled by the system computer which also stores standardization modes for quick recall when multiple mode measurements are desired.



# System Features



- Diffuse/8° geometry with automated specular inclusion/exclusion
- Wavelength range of 350-1050nm with 5nm optical resolution
- Full wavelength scan in a matter of seconds
- D65 source illumination calibrated and controlled in the UV
- Sample measurement areas of 19mm (0.75inch), 9mm (0.35inch) and 4mm (0.16inch)

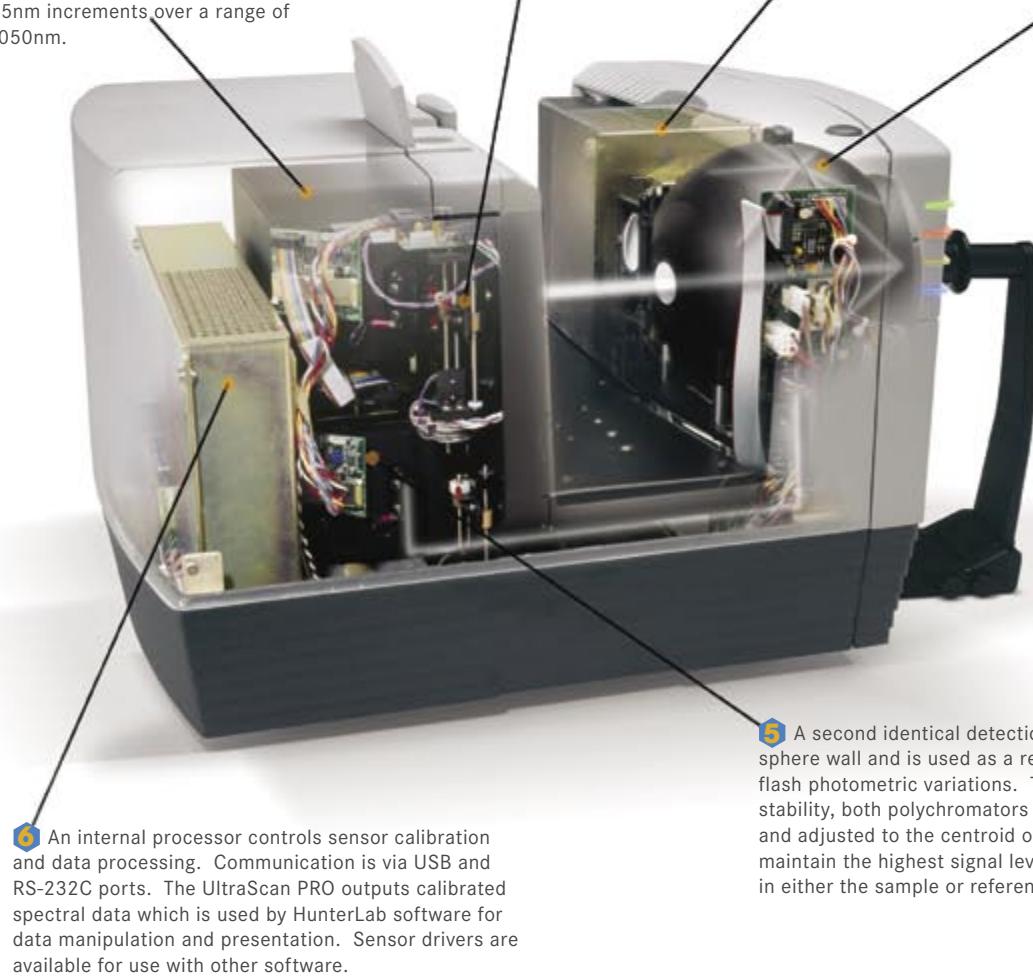
- Retro-viewer for viewing position of small area samples
- Transmittance path lengths up to 80mm
- Large transmission compartment open on three sides
- Read button for convenient initialization of sample measurement
- Status indicator lights visually indicate selected mode
- USB and RS-232C interfaces

## An Inside Look

④ The light then passes into the polychromator where an aberration-corrected holographic concave grating disperses the light into its constituent wavelengths. After appropriate order sorting, light diffracted by the grating is detected by a High IR sensitivity, 512 element, linear array. The optical resolution of the system is 5nm and data taken every 2nm and is reported at 5nm increments over a range of 350nm to 1050nm.

③ The light reflected or transmitted by the sample passes through a lens system. For reflectance, these lenses are computer controlled for three measurement areas of 19mm (0.75inch), 9mm (0.35inch) and 4mm (0.16inch).

② The mixed and balanced source energy is now diffused by the 15.2cm (6inch) integrating sphere and is reflected by a sample at the reflectance port or transmitted through a sample in the transmission compartment. When measuring reflectance, a computer controlled port door at the integrating sphere is closed for Reflectance Specular-Included (RSIN) measurement and opened for Reflectance Specular-Excluded (RSEX) measurement.



⑥ An internal processor controls sensor calibration and data processing. Communication is via USB and RS-232C ports. The UltraScan PRO outputs calibrated spectral data which is used by HunterLab software for data manipulation and presentation. Sensor drivers are available for use with other software.

⑤ A second identical detection system monitors the sphere wall and is used as a reference channel to remove flash photometric variations. To assure wavelength stability, both polychromators are automatically checked and adjusted to the centroid of a xenon emission line. To maintain the highest signal level, no fiber optics are used in either the sample or reference light path.

# Sample Handling Devices



Numerous specialized sample handling devices are available to enable optimum sample presentation for a wide range of samples. Many of these devices are shown below. Contact your HunterLab representative for information on other devices or to have a custom device designed for your unique application.

- Reflectance Shelf to measure the color of nonsolid materials such as powders, pellets, granules and pastes



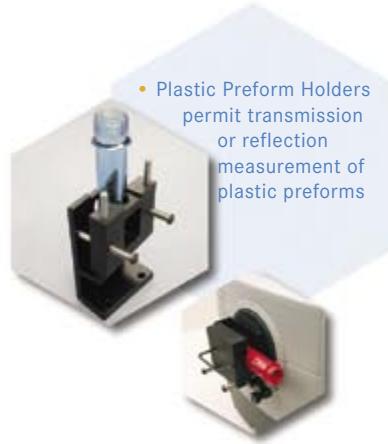
- Transmission Lens Holders for the measurement of ophthalmic lenses and blanks



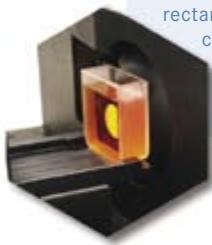
- Tablet and Capsule Port Inserts for reflectance measurement of tablets and capsules



- Plastic Preform Holders permit transmission or reflection measurement of plastic preforms



- Transmission cell holders for rectangular, cylindrical, tall, and flow cells



- Semi-Micro transmission and reflection holders for measurement of small sample volumes



- Skein Holder for measuring yarn and string skeins



- Transmission Clamp for transmission measurement of glass, plastic sheet and film



- Compression Cell Holder for compressing fibers for repeatable measurements



Dedicated to worldwide support through local representation, HunterLab provides over 50 years of experience to meet the color measurement needs of customers around the world. We offer the industry's most comprehensive set of end-to-end solutions – an integrated package of resources, from the complete array of instrumentation, software, and support services to training, education and decades of application knowledge.

UltraScan is a trademark of Hunter Associates Laboratory Inc.

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ISO 9001:2000 Certified

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